Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and	)	ET Docket No. 14-165
	)	
Amendment of Part 74 of the Commission's Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap	)	
	)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	)	GN Docket No. 12-268

To: The Commission

INITIAL COMMENTS OF THE WMTS COALITION

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

The licensed WMTS has been a considerable success. Indeed, because instances of interference into the WMTS are quite rare, health care providers have gained significant confidence in the technology, allowing for the continued expansion of wireless medical telemetry into many more facets of the health care facility, and providing for generally improved patient care and safety. Nevertheless, the Commission has determined to allow unlicensed devices to operate in Channel 37, but only if technical regulations can be developed that will protect all WMTS licensees from harmful interference. In considering the rules that should apply to the use of unlicensed devices in Channel 37, the Commission cannot, and should not, be driven by the goal of creating -- or assuring -- the marketability of unlicensed devices for those who desire to use this band for those purposes. Rather, throughout its consideration of the proposed technical rules, the Commission's primary focus must be on protecting the primary WMTS licensees from harmful interference from any unlicensed use of this band.

Every single incident of objectionable interference into a health care facility's WMTS network has the potential for creating significant risk to patient safety, including critical cardiac care patients, mothers and their unborn fetuses during labor, or emergency room and progressive care patients during critical points in treatment. Such incidents (and thus the patient risk) could extend for many hours, or even days. There is simply no public interest justification – not even to encourage the development of new and exciting uses of unlicensed spectrum – for putting patient safety at risk by being anything less than highly protective of all WMTS licensee environments in developing the rules for unlicensed use of Channel 37.

In this proceeding, the Commission will necessarily have to utilize certain assumptions in developing both the technical regulations that should govern unlicensed devices (e.g., power limits) and the separation distances that will be employed to assure that unlicensed devices are only operating where WMTS licensees will not be subject to interference from unlicensed radio transmissions. It must be remembered that all WMTS licensees are entitled to protection from interference from unlicensed devices, and not just those that operate in a "typical" environment. It is therefore incumbent on the Commission to consider the characteristics of the many different "likely" installations that already exist for WMTS systems, and those planned for future health care facilities in determining appropriate technical requirements.

To the extent the FCC allows unlicensed uses into Channel 37 – which it should not do -- the initial rules at most should only authorize fixed unlicensed devices that have been appropriately registered with, and can be controlled by, the TVWS database administrators. No mobile/personal portable unlicensed devices should be authorized to operate in Channel 37 at this time. The itinerant nature of mobile operations makes identification and isolation of the source and cause of interference extremely difficult, even as the adverse impact on system reliability and patient care of the interference caused by such an itinerant device may have been quite significant.

The Commission has taken the wrong approach for calculating the required separation distances between WMTS licensed systems and newly authorized unlicensed devices. For example, ASHE has identified over 1600 hospitals deploying WMTS above the 10 meters AGL height that the FCC "assumed" in its calculations of the proposed separation. Similarly, it

appears that the formula used in the FCC's calculations assumed that a single unlicensed device would be interfering with a WMTS system deploying a single receive antenna, although the vast majority of larger hospital systems deploying WMTS systems in Channel 37 utilize a distributed antenna system. These and other factors discussed here suggest that the propagation model the FCC has proposed is not appropriate for determining the susceptibility of the WMTS system to interference from unlicensed devices. The distance from the WMTS system at which unlicensed devices should be authorized to operate in order to provide an adequate "protection zone" must be significantly greater than the FCC has proposed. The Commission should revise its methodology to account for the problems identified in its initial approach and then seek further comment on the protection zone size and permitted power levels that such appropriate methodology may yield.

The Commission has placed significant faith in the ability of database technology to control the operation of unlicensed devices in certain restricted bands, and in the technology incorporated in these unlicensed devices to operate as required under the rules. However, no technology-based system that is "failure-proof" exists, so the Commission, operators of unlicensed devices, and the WMTS community must recognize, accept, and have a strong plan for dealing with equipment failures that result in some level of harmful interference being suffered by WMTS licensees from unlicensed devices. The Commission's rules must be clear that the unlicensed devices have no right to continue to utilize Channel 37 when interference to WMTS systems does occur, and the TVWS database administrators must be capable of requiring prompt implementation of the changes necessary to accommodate newly installed or modified WMTS systems that create new "protection zones."

The *NPRM* does not address how the WMTS Database operated by ASHE will interface with the TVWS devices, and who will bear the cost of any modifications that may be required to accommodate such interface. At the very least, the Commission should make clear in the Order in this proceeding that the WMTS database administrator will be entitled to reimbursement, either in the form of reasonable fees paid by unlicensed device operators who seek to use Channel 37, or directly from the TVWS database administrators who interface with the WMTS database, for any costs reasonably incurred by the WMTS database administrator by reason of this new authorization of the use of Channel 37.

Finally, since unlicensed devices will be allowed the same emissions in the adjacent channels as will be allowed in Channel 37, the same separation distances that are imposed on unlicensed use of Channel 37 should apply to the use of unlicensed devices in those adjacent bands. The dramatic reduction in separation for devices operating in adjacent channels such as those tentatively proposed in the NPRM will not be sufficient to protect WMTS systems from adjacent channel interference. If the Commission decides to permit use of the adjacent channels by unlicensed devices, it should limit such use only to those mobile/personal portables that must access the TVWS databases in order to obtain a frequency of operation. Mode II personal portable devices must be required to check the TVWS databases on a very frequent basis.

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To: The Commission

INITIAL COMMENTS OF THE WMTS COALITION

The WMTS Coalition, whose members are listed on Exhibit A attached hereto, hereby comments on the proposals regarding the use of Channel 37 and adjacent channels by unlicensed TV White Space ("TVWS") devices as discussed by the Commission in the *Notice of Proposed Rulemaking* in the above-referenced proceeding.[1] Having determined in the *Report and Order* in GN Docket 12-268 that unlicensed devices would be allowed to operate in the 608-614 MHz band (TV Channel 37), the Commission has initiated this proceeding to develop the appropriate technical parameters for such operations to protect the Wireless Medical Telemetry Service

[1] FCC 14-144, 29 FCC Rcd.12248, released September 30, 2014 (the "*NPRM*"). These comments represent the general consensus positions of the Coalition; however, individual members of the Coalition may file their own comments discussing other issues arising out of the *NPRM*, or even differing with the Coalition's view on a particular issue addressed in these Comments.

("WMTS) and Radio Astronomy Service ("RAS") from harmful interference.[2] Because the WMTS is one of the two primary services currently relying on this band, the WMTS Coalition has a significant interest in this matter.

This Commission has consistently recognized the importance of medical wireless telemetry to the nation's healthcare infrastructure. For the reasons described below, the Coalition urges the Commission in the strongest terms to assure that Channel 37 remains available -- and viable -- as a primary resource for wireless medical telemetry systems. If unlicensed devices are allowed to use Channel 37, they should only be permitted to do so under operating guidelines that have been shown to assure that such use will not create even the smallest possibility of interference to the WMTS licensees. Moreover, in developing the rules imposed on any new or more expanded uses of frequencies immediately adjacent to Channel 37, the Commission must remain cognizant of the potential for harmful adjacent channel interference into WMTS licensed systems and assure that adjacent channel interference will not impair the reliability of Channel 37 for incumbent and future WMTS users.

I. BACKGROUND

Wireless biomedical telemetry devices are used in hospitals to transmit waveforms and other physiological data from patient measurement devices to a nearby receiver's antenna providing early detection of life-threatening physiologic developments so that appropriate intervention can be rendered in a timely manner. Wireless medical telemetry today includes

[2] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6567, 6686 at para. 274 (2014) (the "*R&O*"). As the Commission is aware, the Coalition has strongly opposed the Commission's decision in the *R&O* to allow unlicensed devices to operate in Channel 37 before determining whether technical rules could be adopted that would make such use possible without the threat of interference to WMTS licensees. The Coalition has filed a petition for reconsideration of the *R&O* to that effect.

measurement and recording of a variety of physiological parameters and other patient-related information via both one-way and bi-directional devices.

Prior to the creation of the WMTS in 2000, wireless medical telemetry systems generally operated on an unlicensed basis pursuant to Part 15 on vacant VHF and UHF television channels or on a secondary basis under Part 90. While many systems operated in the 450-470 MHz band allocated for land mobile use, many operated in the vacant TV channels, including the 608-614 MHz band allocated on a primary basis for Radio Astronomy.

However, in the late 1990's, changes in Land Mobile Radio allocations and the initiation of the DTV transition all resulted in an increasing number of reports of interference into wireless medical telemetry systems. One incident in which a broadcast station in Dallas, Texas caused considerable interference to wireless medical telemetry systems operating at the Baylor Medical Center highlighted the need for the Commission to consider a primary allocation of spectrum in which wireless telemetry systems could operate without objectionable interference.[3]

Working cooperatively with the FCC and the Food and Drug Administration, the American Hospital Association ("AHA") and its engineering division, the American Society for Healthcare Engineering ("ASHE"), created a task force of hospitals, clinics and other users of wireless medical telemetry systems, manufacturers of wireless medical telemetry devices, and trade associations involved in the development of medical devices and the delivery of health care

[3] *See Joint Statement of the Federal Communications Commission and the Food and Drug Administration Regarding Avoidance of Interference Between Digital Television and Medical Telemetry Devices,* released March 25, 1998 (available at http://transition.fcc.gov/Bureaus/Engineering_Technology/News_Releases/1998/nret8003.html) and *Office Of Engineering And Technology Fact Sheet, Sharing of Analog and Digital Television Spectrum by Medical Telemetry Devices,* dated March 1998 (available at ftp://ftp.fcc.gov/pub/Bureaus/Engineering_Technology/News_Releases/1998/medical.txt).

services. The AHA task force was charged with determining likely spectrum requirements for wireless medical telemetry in the reasonably foreseeable future and identifying suitable alternatives for satisfying those needs.

As a result of the AHA Task Force recommendations, in 1999 the Commission initiated ET Docket 99-255 to determine the need for, and the parameters of the WMTS.[4] The Commission created the WMTS in 2000,[5] providing a primary allocation for the WMTS in the 608-614 MHz band shared with Radio Astronomy and another primary allocation for the WMTS in the 1.4 GHz band in which future expansion could be accomplished. The Commission also decided to license the WMTS by rule, requiring only registration of the location and frequency of operation of WMTS systems with a new database administrator rather than through individual licenses issued by the FCC. The database was intended to provide newly installed WTMS systems with information about incumbent systems operating in close proximity in order to minimize the potential for inter-WMTS system interference in their design and implementation.

In creating WMTS, the Commission stated that its objectives included "allow[ing] potentially life-critical medical telemetry equipment to operate on an interference-protected basis" and to "improve the reliability of this service."[6] The Commission stated that "[a] specific allocation [to WMTS] is necessary in this case ***to protect the public safety by providing spectrum where medical telemetry equipment can operate without interference.***"[7] The Commission also urged manufacturers and the health care community "to ensure that this

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[4] *Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service*, Notice of Proposed Rulemaking, 14 FCC Rcd 16719 (1999).
[5] *Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service*, Report and Order, ET Docket 99-255, 15 FCC Rcd 11206 (2000) (*WMTS Report and Order*).
[6] *Id.* at para. 1.
[7] *Id.* at para. 11, emphasis added.

spectrum is used efficiently to meet long term needs."[8] And that is exactly what the WMTS community has done, as the licensed WMTS has been a considerable success. Indeed, because instances of interference into the WMTS are quite rare, health care providers have gained significant confidence in the technology, allowing for the continued expansion of wireless medical telemetry into many more facets of the health care facility, and providing for generally improved patient care and safety.[9]

The possibility of allowing unlicensed devices to operate in Channel 37 is not a new issue, but each time the unlicensed community has sought to utilize Channel 37 the Commission previously rejected the possibility.[10] Based on a full record developed with the participation of a significant number of parties interested in the expanded development of TVWS devices, the Commission in 2006 confirmed that, in order to "minimize the risk of interference to certain

[8] *Id.*

[9] There have been some reported incidents of interference from adjacent channel DTV stations, *see*, e.g., http://www.fda.gov/MedicalDevices/Safety/MedSunMedicalProductSafetyNetwork/ucm127780.htm. However, as discussed in more detail below, manufacturers and system designers have learned how to accommodate the existence of adjacent channel DTV broadcast signals through filtering and other means, although these means generally reduce the bandwidth available for WMTS capacity.

[10] The concept of allowing unlicensed devices into TV spectrum was initially introduced through a 2002 Notice of Inquiry in which the Commission expressed concern for "the critical safety function of medical telemetry equipment." (See *Additional Spectrum for Unlicensed Devices below 900 MHz and in the 3 GHz Band*, 17 FCC Rcd 25632, 25637 (2003), at para 14). Then, in its 2004 Notice of Proposed Rulemaking considering the creation of opportunities for unlicensed devices to operate in so-called "white spaces" in the UHF TV spectrum, the Commission proposed "not to allow unlicensed devices to operate on TV Channel 37, due to the special interference concerns associated with the sensitive nature of radio astronomy reception and the critical safety function of medical telemetry equipment." *See, e.g.*, *Unlicensed Operation in the TV Broadcast Bands*, Notice of Proposed Rulemaking, 19 FCC Rcd 10018, 10034 at para. 34 (2004) (the "*White Spaces NPRM")* (proposing not to allow unlicensed devices in Channel 37 due to "special interference concerns associated with … the critical safety function of [WMTS]).

authorized services," no sharing of Channel 37 would be allowed."[11] And as recently as 2008, the Commission has determined that Channel 37 should **not** be subject to sharing with unlicensed TV Bands devices, and in fact should be protected from interference from such devices even operating in adjacent Channels 36 and 38: "[a]s discussed throughout this proceeding . . . there are certain Channels that are not suitable or appropriate for use by unlicensed . . . TV band devices."[12]

Nevertheless, in the *R&O,* the Commission stated that increased scarcity of spectrum available to unlicensed devices as a result of the anticipated repurposing of spectrum for wireless services justifies reversing the prior analysis, determining that "channel 37 could provide additional spectrum for such use in those areas where it is not used for the WMTS and RAS."[13] The decision to permit unlicensed operations in channel 37 was, however, "subject to the development of the appropriate technical parameters for such operations . . . in order to protect the WMTS and RAS from harmful interference."[14] The instant proceeding is premised on developing those technical rules and determining at what locations and with what power levels might unlicensed devices be able to operate "sufficiently removed from WMTS users and RAS sites to protect those incumbent users from harmful interference."[15]

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[11] *Unlicensed Operation in the TV Broadcast Bands*, First Report and Order and Further Notice of Proposed Rulemaking, 21 FCC Rcd 12266, 12267 at para. 2 (2006) (the "*White Spaces First Report")* (deciding not to permit TV bands devices in Channel 37 to minimize the risk of interference to WMTS).
[12] *Unlicensed Operation in the TV Broadcast Bands*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807, 16859-61 paras. 148, 155 (2008) (the *"White Spaces Second Report").*
[13] *R&O,* at para. 276.
[14] *R&O,* at para. 274. The Coalition has petitioned for reconsideration of that decision, which petition is pending.
[15] *Id.*

II. THE COMMISSION MUST TAKE A CONSERVATIVE APPROACH IN DEVELOPING RULES TO PROTECT WMTS AND RAS OPERATIONS FROM INTERFERENCE FROM THE OPERATION OF UNLICENSED DEVICES ON CHANNEL 37

Fundamental to the Commission's determination that unlicensed devices will be authorized to operate in Channel 37 is the premise that technical regulations can be developed that will protect all WMTS licensees from harmful interference. In the *R&O,* the Commission emphasized that "unlicensed operations on channel 37 will be authorized in locations that are sufficiently removed from WMTS users and RAS sites *to protect those incumbent users from harmful interference*." The *NPRM* similarly emphasizes the importance to the public interest of a viable, interference free WMTS and the need for protecting these licensees from harmful interference:

> We recognize the importance of WMTS to patient care, and will remain mindful of this critical function when developing these technical parameters. In this Notice, we propose technical parameters below to protect the WMTS and RAS from harmful interference and will develop a full record on the issues raised in this proceeding before adopting final rules.[16]

It is thus paramount that throughout its consideration of the technical rules that will allow unlicensed devices to operate in Channel 37, the Commission's primary focus *must* be on protecting the primary WMTS licensees from harmful interference from any unlicensed use of this band. While there likely will be pressure from those who favor unlicensed use of Channel 37,[17] the Commission should heed the statements of Chairman Wheeler in taped remarks to

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[16] *NPRM* at para 100

[17] R&O at para. 274 (emphasis added). Many of the proponents of allowing unlicensed devices to operate in Channel 37, however, have recognized that the rules that are developed in this proceeding must be designed to protect WMTS licensees from harmful interference. *See, e.g.* Opposition of Google Inc, and Microsoft Corporation to Petition to Petitions for Reconsideration, GN Docket No. 12-268 (November 14, 2014), at page 9-10: [The FCC's] decision to permit unlicensed devices to operate in channel 37 remains subject to the development of technical rules to prevent harmful interference with other services. The *R&O* specifically indicates that the Commission will permit unlicensed operations only under

ASHE's National Conference in August 2014: "[m]ake no mistake, we will make sure that these new services do not come at the expense of WMTS."[18]

In that regard, the Commission will necessarily need to utilize certain assumptions in developing both the technical regulations that should govern unlicensed devices (e.g., power limits) but also the separation distances that will be employed to assure that unlicensed devices are only operating where WMTS licensees will not be subject to interference from unlicensed radio transmissions. In that regard, it is incumbent on the Commission not merely to consider the protection needed for the "basic" WMTS installation. Rather, the Commission must utilize the characteristics of the many different "likely" installations that already exist for WMTS systems, and those planned for future health care facilities in determining appropriate technical requirements.

The Commission may be willing or able to tolerate some level of interference to over-the-air television reception, or even to wireless telecommunications services, where interference, while objectionable, is not likely to threaten patient care.[19] However, as the Commission considers "how much" protection is needed for WMTS, it must keep in mind the impact on patients who cannot be appropriately monitored by a system suffering such interference. Every single incident of objectionable interference into a health care facility's WMTS network has the potential for creating significant risk to patient safety, including critical cardiac care patients,

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operating parameters and "in locations that are sufficiently removed from WMTS users and radio-astronomy-service sites to protect those incumbent users from harmful interference." Indeed, the recently opened Part 15 rulemaking proceeding devotes several pages to this issue alone, seeking comment on appropriate power limits, separation distances, and other technical requirements to avoid harmful interference to incumbent operations (footnotes omitted).

[18] Taped remarks of FCC Chairman Tom Wheeler to ASHE Annual Conference, August 2014.

[19] And yet, ironically, it appears to the Coalition that the formula and assumptions used in developing protection zones designed to protect consumers from suffering some level of interference into their television reception or wireless microphones yield more conservative and protective results than that used in determining how to protect WMTS from the adverse impacts on patient care.

mothers and their unborn fetuses during labor, or other patients during critical points in treatment. And, (as noted below) such incidents (and thus the patient risk) could extend for many hours, or even days. There is simply no public interest justification – not even in encouraging the development of new and exciting uses of unlicensed spectrum – for putting patient safety at risk by being anything less than highly protective of all WMTS licensee environments in developing the rules for unlicensed use of Channel 37.

Most importantly, in considering the rules that should apply to the use of unlicensed devices in Channel 37, the Commission cannot, and should not, be driven by the goal of creating -- or assuring -- the marketability of unlicensed devices for those who desire to use this band for those purposes. The first principle underlying any decisions with regard to the operation of unlicensed devices in Channel 37 must be to ensure that any such use will not create harmful interference to health facilities utilizing WMTS systems for patient care. The Commission must "make sure that these new services do not come at the expense of WMTS."

A. At Most the Commission Initially Should Authorize Only Fixed Unlicensed Devices to Operate on Channel 37.

Since the inception of the WMTS, the Commission has recognized the dangers inherent in allowing mobile devices to operate co-channel with WMTS. For example, in originally adopting service rules for WMTS spectrum in the 1.4 GHz band in which licensed Part 90 telemetry operations could operate on a co-channel, secondary basis, the Commission noted "[s]ince [secondary utility] telemetry operating within the WMTS primary band poses the greatest threat of interference, we agree with AHA that secondary [uses] should be limited to fixed operation only. We believe that in the absence of conclusive empirical data on the levels of

interference, fixed only operations for secondary [users] will help to identify, isolate and resolve interference conflicts quickly."[20]

In the *NPRM*, the Commission seeks comment on the types of unlicensed devices that should be allowed to operate in Channel 37. As the Commission recognizes, "[t]he most cautious approach would be to limit operations on channel 37 to fixed devices only and to require registration of the locations where the devices are used in the white spaces database. . . . The registration requirement makes fixed devices easer to locate in the event harmful interference occurs."[21] This is a clear example where the Commission must adopt that "cautious" approach, at least in initially allowing Channel 37 to be shared. The Coalition strongly believes that when it comes to authorizing unlicensed devices to operate co-channel with WMTS, the Commission should walk before it runs. The initial rules should only authorize fixed unlicensed devices that have been appropriately registered with, and can be controlled by, the TVWS database administrators. The Coalition emphatically opposes the authorization of any mobile/personal portable unlicensed devices in Channel 37.

As noted above, the Commission must recognize that any interference into WMTS systems will have a significant detrimental impact on the ability of that system to monitor the welfare of patients, some of whom are in potentially life-threatening situations that must be carefully monitored. When interference to a WMTS system does occur, real time monitoring becomes impossible and the diagnostic process is seriously disrupted. Data on the monitoring screens may become blurred or unreadable, physiological signal processing (*e.g.* ECG arrhythmia detection) may be disrupted, or the data may simply be inconsistent with the

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[20] *Amendments to Parts 1,2,27 and 90 of the Commission's Rules to License Services in the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands,* Report and Order, 17 FCC Rcd. 9980,10051-52, para. 193 (2002).
[21] *NPRM* at para 101.

monitored patient's actual condition. The ability of the health care provider to see the vital signs and be alerted to critical and clinically significant patient events that are being monitored is severely degraded.

Moreover, the source of the problem in the health care facility may not be immediately understood by the health care provider, often a nurse practitioner involved (*i.e.*, whether the problem is a system failure, a mechanical failure, or a problem based on radiofrequency interference). As such, resolving the problem becomes extremely difficult and time-consuming. Indeed, Coalition members' experience suggests that many incidents of interference, while heretofore a relatively rare occurrence, will take days or weeks to resolve, as it takes time for the nature of the problem to be identified and then outside resources (often provided by the equipment manufacturer) are required to isolate and resolve the problem. Where the interference is being caused by a fixed source, at least it can, indeed, be identified more easily.

However, as the Coalition and its members have consistently emphasized, authorizing mobile operations in adjacent, and certainly in the same, band presents a much more significant, and essentially unresolvable, threat to the viability of WMTS systems. As discussed in more detail below, the Coalition is extremely concerned with the difficulties the Commission will have in developing effective rules for resolving interference incidents caused by unlicensed <u>fixed</u> devices. It will be virtually impossible to resolve interference from itinerant mobile devices, because the itinerant nature of mobile operations makes identification and isolation of the source and cause of interference extremely difficult, even as the impact of the interference on system reliability and patient care caused by such an itinerant device may have been quite significant.

Nor can the Commission rely on technical requirements to adequately address the issue. Even if the FCC's rules and future technology would allow the TVWS administrators to control

mobile devices and direct them off of Channel 37 as they are getting too close to a licensed WMTS system, no rules or systems can be expected to be 100% reliable. It is not unreasonable to expect that, over time, the number of personal portable/mobile units that may be marketed could number in the hundreds of millions. With these massive numbers, even a compliance rate of 99.9% in the technology within the device (and there is no reason to believe that any consumer device could reach that level of reliability, especially in lower-cost, high volume devices), or, no less likely, a compliance rate of 99.9% in manufacturers only marketing devices that fully comply with the FCC's rules,[22] would result in potentially hundreds of thousands of mobile/personal portable unlicensed devices that could be operating at higher-than-authorized powers or within closer-than-authorized proximity. And all of these devices would have the potential for creating harmful interference to incumbent WMTS systems.

To the extent the Commission allows unlicensed TVWS devices to operate in Channel 37, therefore, the appropriate "cautious" approach must be to experiment with fixed devices registered to a database that can be readily polled to identify potential sources of interference.[23] While the Commission may want to reserve the right to reconsider this issue when it has had sufficient experience with the operation of fixed devices in Channel 37 to justify confidence in technology to provide the requisite level of assurance that interference will not occur, there is no

[22] The Commission has more than enough experience with its equipment certification program for consumer-oriented devices to recognize that compliance with its requirements is not absolute. And even with apparent compliance with the equipment certification program, manufacturing processes are also not infallible.

[23] This is particularly appropriate given the amount of spectrum that will otherwise be available for use by personal/portable unlicensed devices in the guard band, duplex gap and other repurposed 600 MHz spectrum under almost any of the scenarios that the FCC has described in the *R&O*.

public interest justification for subjecting critically ill patients to the much greater risks posed by mobile devices at this time. [24]

B. The Commission Should Determine the Appropriate Size of the Protection Zones and then Determine the Power Levels at which Unlicensed Devices are Permitted to Operate.

The Coalition is extremely concerned by the complexity built into the Commission's various "scenarios" for determining the maximum authorized power at which unlicensed devices will be allowed to operate in Channel 37. Nevertheless, for purposes of determining an appropriate maximum power, the Coalition has assumed that fixed devices may be authorized to operate at as much as 4W EIRP in the band. The issue then can be simplified by determining the minimum separation distance that is required to ensure that unlicensed devices will operate without causing harmful interference to a properly installed and operating WMTS system.

In that regard, the Coalition strongly disagrees with the Commission's approach for calculating the required separation distances. Rather than consider the "average" or "typical" environment in which a licensed WMTS system is operating, the Commission must take a much more conservative approach and consider the much wider variety of environments. It must be remembered that all WMTS licensees are entitled to protection from interference from unlicensed devices,[25] and not just those that operate in a "typical" environment. If the Commission is, as Chairman Wheeler stated, going to "make sure that these new services do not come at the expense of WMTS," then the modeling used to determine the appropriate distances

[24] Authorizing unlicensed personal/portable devices to use Channel 37 need not be forever foreclosed. If their use in other "shared" bands proves the effectiveness of technologies to assure that interference to primary licensees will not occur (or it if occurs it can be promptly resolved) and if the anticipation of regular technology failures proves not to be the case, and if there remains a significant need for personal/portable devices to access Channel 37, the Commission can revisit the matter.

[25] Unlicensed devices will be operated under Part 15 of the Rules, and have no right to cause, and no right to be protected from, interference from licensed services like the WMTS.

must consider realistic "worst-case" scenarios for the WMTS licensed system, as there really is no "typical" environment in which WMTS systems may be operating.

The Coalition has undertaken the task of characterizing the environments in which hospitals are operating their WMTS systems, both in terms of demography (urban, suburban, rural), height and size (HAAT of highest WMTS operations, number of potentially impacted antennas), and system design (single receiving antennas vs. DAS systems). This analysis was undertaken to establish the factors that must be considered in designing rules that will protect all reasonably anticipated WMTS installation environments, and not only the "typical" hospital. Not surprisingly, the "average" or even the "median" environment does not appropriately characterize the wide variations in hospital environments in which WMTS systems are deployed using Channel 37, and the numbers of hospitals at either end of the distribution represents a significant population that must be protected from interference.

For example, ASHE has identified over 1600 hospitals deploying WMTS above the 10 meters AGL height that the FCC erroneously "assumed" highest WMTS deployment height in its calculations of the proposed separation distances.[26] In fact, over 120 registered hospitals have deployed licensed WMTS systems on the tenth floor (approximately 35m AGL) or higher, 20 of which deploy WMTS on the twentieth floor (70 m AGL) or higher. Because this relatively large group of hospitals is entitled to the same level of interference-free operation, it is this much higher antenna height that must be used in any formula for determining the appropriate separation distance.[27]

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[26] *NPRM* at para 110.

[27] While the Commission might want to consider a sliding scale of protection distance based on the antenna height of each WMTS system, this would require a relatively sophisticated coordination process and algorithm, much more akin to the processes and systems that are used to coordinate licensed systems operating on a co-channel basis. The Coalition does not believe that the WMTS database could be easily

Similarly, it appears that the formula used in the FCC's calculations assumed that a single unlicensed device would be interfering with a WMTS system deploying a single receive antenna. But a significant number, indeed, the vast majority of larger hospital systems deploying WMTS systems in Channel 37 utilize a distributed antenna system. It is not unusual for larger hospital systems to be deploying from 300-500 antennas. The large number of antennas will significantly increase the potential for reception of an interfering signal, so this more sophisticated design that must be considered in the analysis of potential interference.

It is also not clear that the FCC's use of FCC/OET TM 91-1 is appropriate in this context. Developed in 1991 to model propagation in suburban areas at distances of less than ten miles, this formula assumes path losses and clutter that will not necessarily be appropriate to a significant number of WMTS installations. Hospitals are often, if not typically, among the tallest buildings around.[28] Newer hospitals also typically have significant elements of glass in their exteriors, with WMTS antennas in most patient rooms in immediate sight of the glass windows. All of these factors suggest that the propagation model using free space loss with very little building loss into the WMTS antennae is more likely to be representative than what the FCC has proposed in determining the susceptibility of the WMTS system to interference from unlicensed devices. When these factors are considered, the Coalition believes that the distance from the WMTS system at which unlicensed devices should be authorized to operate in order to provide

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modified to accommodate this level of coordination, nor does the Coalition believe it could be justified to accommodate unlicensed devices. And, as noted, above, the Coalition would have strong concerns that the technology necessary to protect WMTS licensees from these various protection zones could be sufficiently reliable to assure that it would, indeed, eliminate any threat of interference.

[28] This is certainly the case for many rural hospitals, which are often centralized facilities serving large, widely dispersed populations. We have also shown that the antenna height assumed by the Commission for WMTS deployments is not appropriate for the majority of licensed WMTS installations.

an adequate "protection zone" will also be significantly greater than the FCC has proposed in the *NPRM*.

Moreover, as the Commission well recognizes, the methodology used to calculate the protection distance assumes that the calculation is being made from a single location, while in fact large numbers of hospitals have deployed WMTS antennae throughout their buildings, and in some cases, throughout multi-block campuses. As a result, utilizing the single registration location that is identified in the ASHE WMTS database will not adequately protect those parts of the registered system that may be hundreds of meters or more distant from the registered location. The separation distances imposed on unlicensed devices will therefore need to be generously extended beyond the results of theoretical calculations to accommodate these elements of a real-world WMTS system deployment.[29]

The Commission's calculations also do not consider the aggregation effects of multiple potential interferers. As mentioned above, the Commission's protection zone analysis is insufficient in considering the impact of only a single unlicensed device. As unlicensed devices proliferate, it is almost certain that numerous such devices will surround some hospitals, transmitting potentially interfering signals from a variety of azimuths. Thus, the calculations

[29] As the Coalition has also consistently noted, the Commission must recognize the likely inaccuracy of some location information contained in the ASHE WMTS database. Because the ASHE database served as an information resource for WMTS licensees to determine where other WMTS systems may be located – and principally identified the operator hospital – specific location accuracy was not paramount, as once a hospital was identified in the database, subsequent parties could easily mutually determine where potential co-channel users might actually be operating. That will not necessarily be the case for a TVWS database administrator polling the WMTS database for the specific location of a potentially affected WMTS receiver; in that case, the location of the affected receiver must be far more precise. Since the ASHE database does not contain the requisite level of precision, the FCC should increase the adopted minimum separation distance by some factor to accommodate those inaccuracies.

used to determine an appropriately conservative protection zone must consider the impact of multiple unlicensed devices.[30]

As GE Healthcare has previously indicated,[31] an adequate protection distance for a fixed unlicensed device operating at 4W EIRP is likely to be closer to 20 km than the 6.5 km proposed. Working in cooperation with GE Healthcare, the Coalition has initiated a test program (utilizing special temporary authority from the FCC) by which it will seek to determine path loss values related to building losses, and to a lesser extent losses due to land clutter (foliage, buildings, man-made obstructions, etc.) around installed WMTS systems in hospitals.[32] Additionally, the Coalition hopes to characterize the potential for interference into an installed WMTS system as well as the impact of interference.[33] While the full test program is not yet completed, the tests to date do clearly demonstrate that a TVWS device operating at the power levels and protection distances proposed in the *NPRM* will cause interference into WMTS licensees operating in Channel 37. Although the Coalition cannot yet offer a specific alternative at this time, the Coalition is deeply concerned that the protection distances proposed by the Commission are significantly understated.[34]

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[30] We note that aggregate interference was considered in the protection zone analyses used by the FCC as part of the AWS-3 proceeding for protection of Federal government systems in the 1755-1780 MHz band, (see Final Report of CSMAC Working Group 5) and in the recent unserved service area proceeding (see *Amendment of Parts 0, 1, and 22 of the Commission's Rules with Regard to Frequency Coordination for the Cellular Service*, GN Docket No. 12-268, Report and Order and Further Notice of Proposed Rulemaking, *29 FCC Rcd 14100*.

[31] Comments of GE Healthcare, WT Docket No. 12-268, January 25, 2013, at 44.

[32] See GE Healthcare Experimental STA, 1026-EX-ST-2014, WI9XAF.

[33] Given the difficulties of coordinating such tests with the subject hospital in a fashion that will not impact patient care (or the effectiveness of the operating WMTS system), this test program is not yet complete and full results of this program are not yet available. However, the Coalition and GE Healthcare continue to engage in testing and hope to have a better understanding of the issues and potential alternative solutions in the near future.

[34] When a better alternative is on the table, the Coalition would urge the Commission to itself engage in field testing before final rules are adopted in this proceeding. Such an approach is not new – for example,

As a general matter, the Coalition is also concerned with the Commission's proposal to allow smaller protection distances when the fixed device is operating at lower antenna heights. Because a hospital's WMTS system may be deployed on several floors, there is no reason to believe that a fixed device operating at lower antenna height will not have a line-of-sight into a health care facility with WMTS antennas at the same height, in which case the much closer operation will more likely create interference into the WMTS system. As noted above, it is possible that, at some point in the future, the Commission can determine that database and device technology will be sufficiently trustworthy to be able to determine and permit operation of fixed unlicensed devices in closer proximity to a WMTS licensee, but at ***lower*** power levels.[35] But the Coalition does not believe that the closer operation can or should be permitted at the full powers suggested by the FCC in the *NPRM*.[36]

The Coalition is intrigued by the Commission's discussion of the possibility of simplifying the rules by simply imposing large Exclusion Zones as an alternative to a more detailed, and rigorous case-by-case approach in the larger urban areas of the country. The Coalition agrees that this would be a particularly useful approach in urban and suburban areas where the number of different hospitals deploying WMTS on Channel 37, mapped with

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the Commission required Progeny to engage members of the Part 15 community in cooperative testing to demonstrate that its licensed service offerings would not materially adversely affect incumbent Part 15 devices. *Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules*, Order, 26 FCC Rcd 16878, 16887 ¶ 25 (2011).

[35] Before providing such a sliding scale, the Commission must (1) create an efficient "coordination procedure" for unlicensed devices that assures that TVWS device location is highly accurate and that allows the TVWS administrator to establish and enforce the power levels at which the TVWS device will be allowed to operate in closer proximity and (b) adopt effective rules relating to equipment design that assure that the power levels at which such unlicensed devices will actually be operating in closer proximity to a WMTS licensee are, in fact, at the lower levels. Because TVWS devices are not licensed to operate in any given band, or associated with a particular party responsible to the FCC (as a spectrum licensee would be), the Coalition is appropriately concerned that there is a greater possibility of an inadvertent (or even intentional) use of the maximum power allowed to the device, rather than the lower power authorized to devices in closer proximity.

[36] *NPRM* at para.112.

appropriately conservative protection zones around each, is likely to result in very little – if any--geography in which an unlicensed device could operate at all. This approach would eliminate the vagaries inherent in any formulaic calculation, and it also would reduce the concerns arising out of the inaccuracies of the WMTS database registration information. Using the FCC's CMA boundaries, for example, in the largest 100 Metropolitan areas (where over 50% of the WMTS registered hospitals are located), this is a concept well worth considering in order to simplify the database/coordination process in these areas. This approach would still leave significant areas of the country in less populated areas in which these unlicensed devices could more safely operate outside the designated protection for each individual hospital.

The Coalition is convinced that the Commission's proposed protection zones will not be adequate to eliminate the possibility of interference into WMTS systems. The formula used to calculate the proposed distances, and the assumptions used in calculating them simply will not yield appropriately conservative results to achieve that objective. The Coalition believes that the Commission must revise its methodology to account for the problems identified in its initial approach. With that revised methodology in use, the Coalition urges the Commission to seek further comment on the protection zone size and permitted power levels that such appropriate methodology may yield. While this may impose some delay on the final adoption of regulations, delay is more than adequately warranted by the resulting assurance that patients being monitored by a WMTS system operating in Channel 37 will not be threatened by the impact of interference from newly authorized unlicensed devices.

C. A Well-Defined Mechanism for Eliminating Any Interference that is Created into WMTS Systems from Unlicensed Devices Operating on Channel 37 Must Be Included in the Final Regulations.

In determining that it would authorize unlicensed devices to operate in Channel 37, the Commission placed significant faith in the ability of database technology to control the

operation of unlicensed devices in certain restricted bands,[37] and in the technology within these unlicensed devices to operate as required under the rules. As currently implemented, fixed unlicensed devices must either incorporate technology that will report accurately their location of operation (including any changes that may occur over time) or be professionally installed. The TVWS database will then need to determine whether that location is within the protected zone of a registered WMTS system; and if it is not, the TVWS needs to prohibit the unlicensed devices from operating on Channel 37.

Moreover, the unlicensed device must be capable of polling the White Space database on a sufficiently regular basis to be able to determine if a newly registered WMTS system, or a modification of an existing WMTS registration, has resulted in the protection zones changing and the unlicensed device now being operated within the prohibited area of a WMTS system's protected zone. If so, the unlicensed device must promptly vacate Channel 37. The Commission must expect that over time, significant changes in a hospital's information on file in the WMTS database will occur, as WMTS systems may be redeployed to new or distant facilities within a hospital campus, resulting in a new or expanded "protection zone" for that hospital. And the Commission should also expect that, over time, additional hospitals will register WMTS systems in Channel 37 – some of which will be first registered only when they realize that an unlicensed device is operating in sufficiently close proximity to be causing interference.[38]

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[37] "Since the time the Commission made its decision to prohibit unlicensed use of channel 37, we have designated multiple TV bands database administrators, have had extensive experience working with their databases, and have a high degree of confidence that they can reliably protect fixed operations." *R&O* at para. 276.

[38] As the Commission well knows, there remain a large number of hospitals with WMTS systems that are not yet registered. But when these systems do register, they ***must*** be afforded the same protection from interference from unlicensed devices as a system that is registered today.

In such event, existing deployments of unlicensed devices will be required either to abandon Channel 37 or reduce EIRP accordingly. The Commission's rules must be clear and emphatic that the unlicensed devices have no right to continue to utilize Channel 37 in such cases, and the TVWS database administrators must be capable of requiring prompt implementation of the changes necessary to accommodate newly installed or modified WMTS systems that create new "protection zones."

The Coalition is also concerned with the potential for system errors, at the initial TVWS registration stage; as the unlicensed device is operating; or at any time that the information provided by the unlicensed device operator when the device was initially installed may change. This concern is heightened by the significant potential number of unlicensed fixed devices that will be deployed over time and the growing number of registered WMTS installations that the Commission can expect – indeed should hope – will exist following adoption of the rules contemplated in the *NPRM*.

In any event, no technology-based system that is "failure-proof" exists in reality. Therefore, the Commission, operators of unlicensed devices, and the WMTS community must recognize, accept, and have a strong plan for dealing with equipment failures that result in some level of harmful interference being suffered by WMTS licensees from unlicensed devices. Simply stated, even in adopting appropriately conservative protection zones for WMTS licensees, as long as unlicensed devices are allowed to operate on a co-channel basis with WMTS licensees, the Commission must expect that there will be cases where these devices cause harmful interference into licensed WMTS operations.

To that end, any rules adopted in this proceeding must provide a very detailed, efficient and compact process by which WMTS licensees can require the immediate suspension of

operation by any unlicensed device that is suspected of causing interference, until such time as the interference has been fully resolved. As discussed above, when interference into a WMTS system occurs, the source of the interference will not likely be immediately evident to the health care practitioners (or even the technology-oriented management of the health care facility). Whenever the hospital recognizes that the problem is caused by an external source, the WMTS licensee will face the additional problem (and burden) of needing to identify the number of unlicensed devices that may be operating within its geographic area that may be the source of the interference, and then being able to contact those that are most likely to be the source to work cooperatively to resolve the issue.

The rules adopted in this proceeding must give WMTS licensees the tools necessary to access the TVWS databases to determine this key information. No less important, with that information in hand, WMTS licensees must be able to require all potentially interfering devices to cooperate in isolating the interference source and resolving the problem. Remembering that while interference is being suffered, patient care is being adversely impacted (at significant risk to patient safety and cost to the health care provider), WMTS licensees should not be forced to engage in lengthy administrative processes to identify and resolve interference from unlicensed TVWS users.

The Commission is well aware of instances in which interference to licensed services can take several weeks, if not months, to resolve as parties present their case before the agency. Such delays simply cannot be tolerated when patient care is at risk. Unlicensed devices will be operating at the sufferance of the primary licensees, and can claim no "standing" to the use of Channel 37 at the expense of WMTS systems. And while there may be instances where more than one unlicensed device must suspend operations until the actual source of the interference is

isolated – at some inconvenience to the unlicensed device operator and its subscribers – that inconvenience pales in comparison to the risk to patient safety and care being suffered by the WMTS licensee.

The Coalition is particularly concerned because none of the currently approved TVWS databases is capable of quickly identifying and then shutting down (or requiring a change of channels by) a potentially offending unlicensed device when interference does occur into a WMTS licensed system. Without these capabilities in the TVWS database, the interfering signal could continue to adversely impact one or more hospitals for a very long period of time. This is a matter that must be addressed in the rules that are adopted in this proceeding.

D. The *NPRM* Has Not Adequately Addressed How the WMTS Database Will Interface with the TVWS Databases to Ensure that Unlicensed Devices Do Not Interfere with WMTS Licensed Systems.

The Coalition is also concerned that both the ASHE WMTS database and the TVWS databases will require modification in order to be able to provide the necessary assistance to WMTS licensees suffering interference that they suspect is caused by unlicensed use of Channel 37. The Coalition believes that no unlicensed devices should be allowed to operate in Channel 37 until such mechanisms as the Commission adopts here can be fully implemented, tested and placed into commercial operation by both the WMTS database administrator and all of the authorized TVWS database administrators.

Despite the Coalition's consistently stated concerns in the FCC's Incentive Auction proceedings,[39] the *NPRM* does not address how the WMTS Database operated by ASHE will interface with the TVWS devices, and who will bear the cost of any modifications that may be required to accommodate such interface. The Commission has properly determined in the

[39] *See, e.g. Initial Comments of the WMTS Coalition*, GN Docket No. 12-268, January 25, 2013, at 20-22; *Reply Comments of the WMTS Coalition*, GN Docket N0. 12-268, March 12, 2013, at 13.

NPRM that "[a] duplicative registration requirement would be burdensome for WMTS users," and therefore concludes that "using data from the WMTS database in the white space databases is preferable to requiring authorized health care providers to register in both databases."[40] But the *NPRM* leaves to negotiations among the Wireless Telecommunications Bureau (WTB), which oversees the WMTS coordinator, the Office of Engineering and Technology, which oversees the TVWS database administrators, and ASHE to "to develop procedures to transfer the necessary information to the white spaces databases in a compatible format."[41]

This is not likely to be an easy task,[42] and likely will require significant time and testing to create the necessary level of confidence that the Commission's approach for protecting WMTS licensees from interference from newly authorized unlicensed devices will, in fact, work. The Coalition also believes that the approach proposed in the *NPRM* – leaving these key issues to future discussions with the FCC Staff ***after*** rules for sharing have been adopted -- puts undue pressure on the WMTS database manager to find a solution, without any clear path to reimbursement for any modifications to the WMTS database that may need to be incurred. At the very least, the Commission should make clear in the Order in this proceeding that the WMTS database administrator will be entitled to reimbursement, either in the form of reasonable fees paid by unlicensed device operators who seek to use Channel 37, or directly from the TVWS

[40] *NPRM* at para. 173.
[41] *Id.*
[42] The issues that must be addressed go beyond merely how to implement, and pay for, the hardware or software changes that must be made to accommodate access to the WMTS database by the TVWS database administrators. The Commission must also consider a number of legal issues that arise by reason of the use of the data gathered by the WMTS database (for a very different purpose) in interfacing with the TVWS databases. For example, how will the Commission assure that the information provided by ASHE to the TVWS databases will have the appropriate level of cyber security and privacy? Will the WMTS database administrator be obligated to warrant in any way the accuracy of the information provided to the TVWS databases? If the information is not accurate, who will bear any liability if, upon receiving accurate information about the location of a WMTS licensee, an unlicensed device operator is required to relocate, or reduce power, or otherwise incur costs to accommodate the more accurate WMTS location?

database administrators who interface with the WMTS database, for any costs reasonably incurred by the WMTS database administrator by reason of any new authorization of the unlicensed use of Channel 37. These reimbursable costs should include both the expenses incurred in accommodating the sharing of information with TVWS database administrators and any expenses that the WMTS database administrator may be required to incur by reason of the tasks it may be asked to undertake in assisting in the resolution or mitigation of instances of interference resulting from the sharing of Channel 37 by unlicensed device operators.

E. If Unlicensed Devices Are Authorized to Operate in Bands Adjacent to Channel 37, the Protection Distances and Power Limits Utilized in Channel 37 Should Apply Equally to Adjacent Channels. The Need for the Emissions Mask Imposed on TVWS Devices in These Bands Can Thus Be Eliminated.

As the Commission notes in the *NPRM*, the agency was appropriately concerned about the potential for interference into WMTS and RAS systems when the rules providing for TVWS devices were initially adopted. Therefore, significantly more stringent out-of-band emission limits were imposed on TVWS devices. These limits were appropriate "to protect the WMTS from interference by personal/portable white space devices that could be used in close proximity to WMTS receive antennas . . . [and were] applied to fixed devices as well as personal/portable devices."[43] In fact, as the Commission also notes in the *NPRM*, Channels 36 and 38 were reserved for wireless microphones where these bands were not in use by a television broadcast licensee, so operation by TVWS devices on channels directly adjacent to Channel 37 has not been an issue for WMTS licensees.[44]

However, as the result of the *R&O*, all three channels are now proposed to be available for use by unlicensed devices. Thus, a different approach for protecting WMTS licensees is

[43] *NPRM* at para 126 (footnotes omitted)
[44] *Id.* at para 127

appropriate; one consistent with the regulatory structure suggested for use in Channel 37. The *NPRM* therefore proposes that, "the [TVWS] database will enforce both co-channel and adjacent channel separation distances from the WMTS, which will ensure that emissions that fall within Channel 37 do not cause harmful interference to the WMTS."[45] The Coalition generally agrees with this approach. That is, the need for the more stringent emission mask requirements on the use of Channels 36 and 38 can be eliminated, but ***only*** if adequately conservative separation distances have been utilized to assure that adjacent channel interference will not be suffered by WMTS licensees.

In that regard, since unlicensed devices will be allowed the same emissions across Channels 36-38, the Coalition believes that the same separation distances that are imposed on unlicensed use of Channel 37 should apply to the use of unlicensed devices in those adjacent bands. The Coalition does not believe that a dramatic reduction in separation for adjacent channels such as those tentatively proposed in the *NPRM* will be sufficient to protect WMTS systems from adjacent channel interference.

As the Commission recognized in the *NPRM*, citing Coalition member GE Healthcare, most WMTS systems operating on Channel 37 have limited rejection capability for signals in Channels 36 and 38.[46] The filtering needed by TVWS devices to satisfy the emission mask that has been imposed on unlicensed devices to date was intended to eliminate signals from adjacent channels being received by WMTS licensees. If the Commission desires to eliminate that

[45] *Id.* at para 128

[46] In those cases where a WMTS system was installed in close proximity to an existing UHF broadcast licensee operating on either Channels 36 or 38, additional filtering was typically employed to reject signals from these adjacent channel licensees, but the result is a significant narrowing of the band available for use by WMTS systems, reducing the system capacity and/or increasing the cost for such system. However, those systems that are not operating in close proximity to a broadcast station on Channels 36 or 38 typically are not capable of such filtering.

emission mask, and allow the same level of emissions in the adjacent channels, it cannot allow them to operate in any closer proximity to the WMTS licensee than the co-channel devices. Doing so will create significant risk of interference from the relatively stronger signals being produced by close-by unlicensed devices. On the other hand, by maintaining an adequate geographic separation between potentially impacted WMTS systems and unlicensed devices operating in either the primary Channel 37 or adjacent Channels 36 and 38, the risk of harmful interference will be greatly reduced.

In that regard, while the Coalition strongly prefers that personal/portable devices be prohibited in all of these bands, if the Commission decides to permit use of the adjacent channels by unlicensed personal/portable devices, it should limit such use only to those personal/portables that must access the TVWS databases in order to obtain a frequency of operation. Moreover, if Mode II personal/portable devices are going to be operating in channels immediately adjacent to Channel 37, it is also important that they be required to check the TVWS databases on a very frequent basis. Their very mobility provides opportunities for devices that were well outside a WMTS's protected zone when first assigned Channel 37 to move well within that protected zone soon thereafter.

Interestingly, the Commission has proposed to shorten the intervals for TVWS devices to check the TVWS database in order to protect wireless microphones.[47] The threat of interference to a WMTS licensee from an unlicensed device operating in adjacent channels is certainly no less significant than the impact such interference would have on wireless microphones. The Commission's proposal to amend the rules to require that any personal/portable device that has

[47] The Coalition applauds and supports the Commission's decision to exclude the operation of unlicensed wireless microphones from Channel 37. While those devices may be able to operate on a fixed basis outside of the adopted protection zones, as any other unlicensed device may, there is no basis for allowing itinerant unlicensed microphones to operate in close proximity to WMTS licensees.

been authorized use of any channel adjacent to Channel 37 must re-check the database at time intervals not to exceed 20 minutes is a step in the right direction. So, too, is the change to the rule that would require any such device promptly to cease the use of Channel 37 if it cannot establish contact with the TVWS database within ten minutes of that interval.[48] While even this rule poses some threat of interference when a personal portable is moved quickly inside the protection zone of a WMTS licensee, if those zones are established at appropriately conservative sizes, any such interference – while generally unacceptable and still threatening to patient safety -- should be of short duration.

III. CONCLUSION

The Coalition has had, and still has, grave concerns that the FCC's commitment to allowing the use of Channel 37 by unlicensed devices has "skewed" its consideration of the rules that will govern the operation of those devices. The resulting proposals for minimal protection zones included in the *NPRM* – which the Coalition has shown result from the use of inappropriate propagation models coupled with erroneous assumptions about the WMTS operating environment -- amplify those concerns. The Coalition believes that the Commission must pay more than mere lip service to the goal of assuring protection of WMTS licensees from interference. Instead, in every aspect of this proceeding, the Commission should consider first how to protect WMTS licensees from any possibility of interference from these secondary unlicensed users, and only when that objective has been reached, establish the guidelines for operation. Whether in determining what unlicensed devices will be authorized to operate in Channel 37 or adjacent bands, at what power, or how close to WMTS licensees such operation should be permitted, the first question should be:

[48] *NPRM* at para 190.

> Have we been sufficiently conservative in our approach and analysis that we have total comfort that interference to WMTS systems, and the potential risk to patient safety, not only should not, but will not occur?

The Commission's initial proposals in the NPRM simply do not go far enough to answer that question affirmatively.

Respectfully submitted,

THE WMTS COALITION

/s/
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February 4, 2015

EXHIBIT A

MEMBERS OF THE WMTS COALITION
(Listed Alphabetically)

1. The American College of Clinical Engineering
2. The American Society for Healthcare Engineering of the American Hospital Association
3. The Association for the Advancement of Medical Instrumentation
4. Cardiac Science
5. ECRI Institute
6. GE Healthcare
7. Mindray North America
8. Nihon Kohden America, Inc.
9. Philips Healthcare
10. ScottCare Corporation
11. Spacelabs Healthcare, LLC
12. VHA Center for Engineering & Occupational Safety and Health (CEOSH)